

Claims

[c1] 1. A planar solid oxide fuel cell stack comprising a lower horizontal compression plate, an upper compression plate, a plurality of interleaved fuel cells, seals and interconnects, a cathode current collector plate and an anode current collector plate disposed between the upper and lower compression plates, wherein the stack defines vertical fuel intake and exhaust manifolds and vertical air intake and exhaust manifolds, said stack comprising:

- (a) a seal element having a cell opening;
- (b) a compressible, conducting element disposed within the cell opening of the seal element;
- (c) wherein the seal element and the compressible element are disposed between the cathode current collector plate and a terminal interconnect at the cathode end of the stack or between the anode current collector plate and a terminal interconnect at the anode end of the stack, or both.

[c2] 2. The fuel cell stack of claim 1 wherein the compressible element comprises a metal foam.

[c3] 3. The fuel cell stack of claim 2 wherein the compressible element comprises a nickel foam.

- [c4] 4.The fuel cell stack of claim 1 wherein the seal element defines a small fuel passage from the fuel intake manifold to the fuel exhaust manifold such that fuel may pass through or around the compressible element.
- [c5] 5.The fuel cell stack of claim 1 wherein the interconnect comprises flow-directing ribs in contact with an electrode surface and the conducting element.
- [c6] 6.A planar solid oxide fuel cell stack having a compression plate and a terminal fuel cell, said fuel cell stack comprising:
 - (a)a current collector plate comprising a substantially planar element disposed immediately adjacent the compression plate;
 - (b)an interconnect plate disposed immediately adjacent and in electrical contact with the terminal fuel cell;
 - (c)a compressible layer comprising a compressible electrically conductive element in electrical contact with the interconnect plate and the current collector plate.
- [c7] 7.The fuel cell stack of claim 6 wherein the compressible layer further comprises a seal element surrounding the compressible element.
- [c8] 8.The fuel cell stack of claim 7 wherein the compressible element comprises an oxidizable material, and the seal

element defines a fuel passage for diverting fuel from a fuel intake manifold, through or around the compressible element, and into a fuel exhaust manifold.

- [c9] 9. The fuel cell stack of claim 8 wherein the compressible element comprises nickel foam.